

# A CLINICAL TRIAL OF CHLORHEXIDINE AND NOXYTHIOLIN IN GYNAECOLOGICAL SURGERY

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POSTOPERATIVE bacteriuria occurs in about one-third of patients undergoing major gynaecological surgery and its incidence is related to the method of bladder management (Mustafa and Pinkerton 1968). Although the bacteriuria is cured, in the vast majority of patients, by the time of follow-up in 6 weeks, its incidence adds to the immediate postoperative morbidity and may prolong the patient's stay in hospital. For these reasons various measures for the prevention of postoperative bacteriuria have been introduced. The most effective of these measures are closed bladder drainage (Linton and Gillespie 1962) and the instillation of an antiseptic into the bladder (Paterson *et al*, 1960). The commonly used bladder antiseptics, in gynaecology, are chlorhexidine and, more recently, noxythiolin ("Noxyflex"). The value of these antiseptics in the prevention of postoperative bacteriuria has been assessed in this study.

## PATIENTS AND METHODS

One hundred patients who had vaginal surgery performed during 1969 in the Royal Victoria Hospital, Belfast, were studied in this investigation. The details of the operations are shown in Table I. All these patients had stress incontinence

TABLE I      *Operations performed*

<i>Type of operation</i>	<i>No. of patients</i>
Vaginal hysterectomy and repair .....	70
Manchester repair .....	6
Anterior and posterior repair .....	3
Anterior repair .....	21
Total .....	100

which was treated by a Kelly-Kennedy type of operation and none of them had preoperative bacteriuria. They all had indwelling catheters inserted at the end of operative procedures and the postoperative bladder management was carried out as previously described (Mustafa and Pinkerton 1968).

The triphenyl-tetrazolium-chloride (TTC) test (Simmons and Williams 1962; Pinkerton, Houston and Gibson 1965) combined with colony counting on the urine was used for the diagnosis of bacteriuria.

### *Bladder Antiseptic*

The patients were divided into two groups of 50 patients each. In group 1 chlorhexidine was used: 50 ml. of chlorhexidine digluconate (1:5,000) were

instilled into the bladder at the end of the operation and 50 ml. were then instilled twice a day for three days after which the indwelling catheter was removed. In group 2 noxythiolin was used: 50 ml. of 1 per cent solution (made by adding the contents of one vial - 2.5 grams - to 250 ml. of cold distilled water and used within 48 hours) were instilled into the bladder at the end of the operation and 50 ml. were then instilled twice a day for 3 days after which the catheter was removed. Alternate patients were chosen for each antiseptic and none of the patients in either group received prophylactic antibiotics. All patients were examined 6 weeks after discharge from hospital.

### RESULTS

The results are shown in Tables II and III. Postoperative significant bacteriuria developed in 16 (32 per cent) of the 50 patients who had chlorhexidine instillations

TABLE II *Infecting organisms*

<i>Organisms</i>	<i>No. of patients infected</i>	
	<i>Group 1 (chlorhexidine)</i>	<i>Group 2 (noxythiolin)</i>
Coliforms	8	6
Proteus	6	5
Enterococcus	1	1
<i>Klebsiella aerogenes</i>	1	0
Total	16	12

TABLE III *Incidence of postoperative significant bacteriuria*

<i>Group</i>	<i>Total number of patients</i>	<i>Number of infected patients</i>	<i>Percentage</i>
Group 1 (chlorhexidine)	50	16	32
Group 2 (noxythiolin)	50	12	24
Total	100	28	28
$\chi^2=0.79$	d.f.=1	0.50 > P > 0.30	
Difference not significant at P=0.05			

and 12 (24 per cent) of those who had noxythiolin instillations. Postoperative haematuria occurred in 2 patients, one from each group, and in both cases disappeared within 48 hours.

The bacteriuria was treated by ampicillin and in all patients, except one, had disappeared by the time of follow-up. This patient had an intravenous pyelogram which showed appearances of chronic pyelonephritis on the left side with slight compensatory hypertrophy on the right side. She was referred to the urological unit for further treatment.

## DISCUSSION

As the patients in both groups had similar operative procedures performed by the same medical staff, and as the postoperative bladder management, except for the antiseptic used, was carried out on identical lines by the same nursing staff, it is reasonable to accept the difference in incidence of postoperative bacteriuria in the two groups as a measure of the difference in the efficacy of chlorhexidine and noxythiolin as bladder antiseptics. Although the rate of incidence of postoperative bacteriuria with noxythiolin (24 per cent) was lower than that with chlorhexidine (32 per cent), there was no statistically significant difference between these figures ( $\chi^2=0.79$ , d.f.=1,  $0.50 > P > 0.30$ ).

Although noxythiolin seems to be a slightly better bladder antiseptic than chlorhexidine, its range of bactericidal action *in vivo* is not as good as that *in vitro*; noxythiolin was found to be active *in vitro* against a wide range of antibiotic-resistant Gram-negative bacteria (Horsfield, 1967) and yet 11 of our patients who had noxythiolin instillations were infected by Gram-negative bacteria which responded readily to ampicillin treatment.

Two patients, one from each group, developed haematuria apparently due to chemical irritation of bladder mucosa by the antiseptic, for in both patients when the instillations of antiseptic was discontinued the haematuria disappeared within 48 hours. A similar finding was reported by McFadyen and Simmons (1968).

In this study the overall incidence of postoperative significant bacteriuria was 28 per cent and in all patients, except one, the bacteriuria was easily eradicated by ampicillin treatment. This is in agreement with our earlier findings and emphasises further the importance of urinary tract infection as a cause of postoperative morbidity in gynaecology.

## SUMMARY

The efficiency of chlorhexidine and noxythiolin as bladder antiseptics in gynaecology was assessed. Significant postoperative bacteriuria occurred in 32 per cent of patients who had chlorhexidine instillations and 24 per cent of those who had noxythiolin instillations. Two patients, one from each group, developed haematuria. The overall rate of postoperative bacteriuria was 28 per cent and all patients, except one, responded promptly to ampicillin treatment.

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